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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ANGADI, MAKI A

ART UNIT

PAPER NUMBER

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,531	Applicant(s) BROER ET AL.	
	Examiner MAKI A. ANGADI	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 21 and 23-27 is/are rejected.
- 7) ☒ Claim(s) 20, 22, 28 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Examiner acknowledges amendment to claims 20 and 22 and the rejection of these claims under 35 U.S.C. 112, 2nd paragraph is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-5, 7-9, 11-12, 14-15, 17-18 and 23-24 are rejected under 35 U.S.C. 103(a) over Goff et al. (US Patent No. 4,329,419) in view of Minamizaki

(US Patent No. 6,030,662) and Malins et al. "Embossed polymer leaky waveguide device for spectroscopic analysis", "The Royal Society of Chemistry,

As to claims 1-3, 5, 11, 17, 18 and 23-24, Goff discloses a method that reads on the process of preparing polymeric relief structure (col.1, lines 38-40) that comprises: (a) coating a substrate with a coating composition that includes radiation-sensitive ingredients (0.5-15 wt%) (polymerizable poly-functional acrylate compounds) (col.1, lines 43-45, lines 56-68 and col.2, lines 1-7); (b) locally treating the coated substrate with electromagnetic radiation (col.3, lines 60-63) having a periodic radiation-intensity pattern, forming a latent image (col.4, lines 1-3), at temperature of about 30-400°C (col.3, lines 53-66); (c) photo-polymerizing the resulting coated substrate on exposure to radiation (col.1, lines 43-55).

Goff does not expressly disclose that the resulting process for producing polymeric relief structure reduces the interfacial tension of the coated substrate. However, Minamizaki discloses a treatment method that leads to reduction in surface energy of the substrate surface (col.2, lines 62-65) and through cross-linking reaction by heating or irradiating the substrate coated with radiation sensitive ingredients (col.1, lines 57-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to reduce the interfacial tension of the substrate because Minamizaki illustrates that the reduction of the surface energy of the substrate leads excellent release property, water repellency, oil repellency of the treated substrates (col.1, lines 5-8).

Art Unit: 1792

Goff does not expressly disclose a photo-embossing process in the preparation of a polymeric relief structure. However, Goff discloses that polymer structure is exposed to radiation (col.3, lines 60-63) through a pattern and photopolymerized to form a relief structure (col.1, lines 43-45). One who is skilled in the art should be able to perform photo-embossing by exposing the polymeric structure to radiation to form a sharp definition and with good mechanical, chemical and electrical properties (col.1, lines 47-52) and optical components.

As to claims 4, 14 and 15, Goff discloses that the radiation sensitive ingredients include monomers (hydroxy alkyl acrylates and methacrylates) and polymerization initiators (polymide ester resins, col.3, lines 10-36) and polymer dissolved in monomer (col.1, lines 51-67).

As to claim 7, Goff discloses the process of coating of a solid film after evaporation of the volatile solvent (col.3, lines 64-67 and col.4, lines 1-3).

As to claims 8 and 9, Goff discloses the use of mask (col.4, line 7) and UV radiation (col.3, lines 60-63) for the fabrication of relief structure.

As to claim 12, Goff discloses the polymer coating with a molecular weight in the range of about 5000-75,000 g/mol (col.3, lines 30-36).

Claim Rejections - 35 USC § 103

3. Claim 6 is rejected under 35 U.S.C. 103(a) over Goff et al. (US Patent No. 4,329,419) in view of Minamizaki (US Patent No. 6,030,662) as applied to claim 1, in further view of Summersgill et al. (US Patent No. 6,671,095).

Goff discloses the use of photo-initiator (col.2, lines 35-37) but is silent about the use of thermal initiator in the fabrication of relief structures. However, Summersgill discloses the use of photo-initiators and thermal initiators (col.7, lines 11-16) in the fabrication of relief structures. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to include photo-initiators and thermal initiators in the fabrication process employed by Goff because Summersgill illustrates that photo-initiators and thermal initiators facilitate the curing of the resin (col.7, lines 4-8).

Claim Rejections - 35 USC § 103

4. Claims 13 and 16 is rejected under 35 U.S.C. 103(a) over Goff et al. (US Patent No. 4,329,419) in view of Minamizaki (US Patent No. 6,030,662) as applied to claim 1 and 5, in further view of Fryer et al. *Macromolecules*, Vol.34, (2001) pages 5627-5634.

Goff is silent about the glass transition temperature of the polymer. However, Fryer discloses the glass transition temperature (T_g) of about 110°C (483K) for PMMA in the formation polymeric relief structure (page 5631, Fig.2-3, paragraph 2) and interfacial tension of about 500-2000 mJ/cm² (Fig.4, page

5632). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to select polymer with T_g higher than 300K and interfacial energy of at least 10 mJ/m^2 because Fryer illustrates T_g higher than 300K for PMMA provides relief structure with low cost and excellent uniformity and dimensional stability (page 5628).

Claim Rejections - 35 USC § 103

5. Claims 10, 25-27 are rejected under 35 U.S.C. 103(a) over Goff et al. (US Patent No. 4,329,419) in view of Minamizaki (US Patent No. 6,030,662) as applied to claim 1, in further view of Phillips et al. (US Patent No. 6,987,590).

Goff is silent about the process of managing light using polymeric relief structure. Phillips discloses optical structures that exhibit the effects of surface relief structures, such as holograms or diffractive gratings to form repetitive patterns (col.2, lines 31-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to form optical structures using the fabrication process employed by Goff because Phillips illustrates that optical structures using surface relief pattern provide several applications for surfaces embossed with holographic pattern which range from decorative packaging such gift wraps, to security documents such as bank notes and credit cards (col.1, lines 32-35).

Claim Rejections - 35 USC § 103

6. Claims 19 and 21 is rejected under 35 U.S.C. 103(a) over Goff et al. (US Patent No. 4,329,419) in view of Minamizaki (US Patent No. 6,030,662) as applied to claim 1 and 18, in further view of Bailey et al. (US Pub. No. 2005/0064344).

Goff is silent about the aspect ratio (AR) of the polymeric relief structure. However, Bailey discloses the aspect ratio of nanoscale relief structures in the range from about 0.1 to about 10 (paragraph 0023). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to select AR in the formation of relief structures employed by Goff because Bailey illustrates that AR of nanostructures determine the ease and reliability of optical alignment techniques (paragraph 0020).

Allowable Subject Matter

7. Claims 20, 22, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The closest prior art of Goff et al. (US Patent No. 4,329,419) fails to disclose *“polymeric structure with the maximum absolute value of the curvature ($|k_{max}|$) in the range of about 0.35-0.7 μm^{-1} ”*

Response to Arguments

8. Applicant's arguments filed 2/20/2009 have been fully considered but they are not persuasive.

Applicants' arguments on pages 8-9 of the reply asserting that the reference of Goff does not disclose photo-embossing process that include the steps necessary for this process are not convincing. Goff's reference discloses the process of coating a substrate with radiation sensitive ingredients (col.1, lines 56-60) and locally treating the coated substrate with electromagnetic radiation (cols.43-46) and polymerizing and/or cross-linking the coated substrate on exposure to radiation (col.3, lines 60-63). Therefore, one who is skilled in the art at the time of the invention was made should be able to employ photo-embossing process for optical components.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory

Art Unit: 1792

action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAKI A. ANGADI whose telephone number is (571)272-8213. The examiner can normally be reached on 8 AM to 4.30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

Art Unit: 1792

Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Maki A Angadi/
Examiner, Art Unit 1792

/Shamim Ahmed/
Primary Examiner, Art Unit 1792